

WHAT IS CLAIMED IS:

1. A method of selectively removing a dielectric disposed on a substrate having a first dielectric material and a second dielectric material disposed thereon, comprising:
positioning the substrate in proximity with a fixed abrasive chemical mechanical polishing pad;
dispensing a polishing composition having at least one organic compound therein between the substrate and the polishing pad; and
chemical mechanical polishing the substrate.
2. The method of claim 1, wherein the at least one organic compound comprises amino acids and combinations thereof.
3. The method of claim 2, wherein the amino acid comprises glycine.
4. The method of claim 1, wherein the at least one organic compound forms between about 0.01 weight percentage (wt. %) and about 20 wt. % of the polishing composition.
5. The method of claim 1, wherein the polishing composition further comprises at least one pH adjusting agent, deionized water, and combinations thereof.
6. The method of claim 1, wherein the polishing composition is an abrasive free composition and comprises between about 1 wt. % and about 8 wt. % glycine, deionized water, and potassium hydroxide as the pH adjusting agent.
7. The method of claim 1, wherein the pH of the polishing composition is about 7 or more.
8. The method of claim 1, wherein the pH of the polishing composition is between about 9 and about 12.

9. The method of claim 1, wherein the substrate includes a shallow trench isolation structure comprising the first and second dielectric layers.
10. The method of claim 9, wherein at least one of the first and second dielectric materials comprises a nitride layer.
11. The method of claim 1, wherein the first dielectric material has a first removal rate wherein the second dielectric material has a second removal rate less than the first removal rate.
12. The method of claim 11, wherein the first dielectric material is silicon oxide and the second dielectric material is silicon nitride.
13. The method of claim 11, wherein the silicon oxide is removed at a rate between about 50 Å/min and about 5000 Å/min.
14. The method of claim 13, wherein the silicon nitride is removed at a rate between about 0.01 Å/min and about 300 Å/min.
15. The method of claim 11, wherein the silicon oxide and the silicon nitride are removed at a removal rate ratio of about 10:1 or greater.
16. The method of claim 11, wherein the silicon oxide and the silicon nitride are removed at a removal rate ratio from about 100:1 to about 2000:1.
17. A method of processing a substrate to selectively remove an oxide material disposed on a nitride material, comprising:
 - positioning the substrate in proximity with a fixed abrasive chemical mechanical polishing pad;

dispensing a polishing composition having at least one organic compound, at least one pH adjusting agent, and deionized water, between the substrate and the polishing pad; and

removing the oxide material and the nitride material at a removal rate ratio of the oxide material to the nitride material between about 10:1 or greater.

18. The method of claim 17, wherein the oxide material is silicon oxide and the nitride material is silicon nitride.

19. The method of claim 17, wherein the oxide material and the nitride material are removed at a removal rate ratio of the oxide material to the nitride material from about 100:1 to about 2000:1.

20. The method of claim 17, wherein the at least one organic compound comprises amino acids and combinations thereof.

21. The method of claim 17, wherein the at least one organic compound comprises glycine.

22. The method of claim 17, wherein the at least one organic compound forms between about 0.01 wt. % and about 20 wt. % of the polishing composition.

23. The method of claim 17, wherein the polishing composition is an abrasive free composition and comprises between about 1 wt. % and about 8 wt. % of glycine, deionized water, and potassium hydroxide as the pH adjusting agent.

24. The method of claim 17, wherein the pH of the polishing composition is about 7 or more.

25. The method of claim 17, wherein the pH of the polishing composition is between about 9 and about 12.

26. A composition for removing dielectric materials in an abrasive-free slurry chemical mechanical polishing technique using a fixed abrasive polishing pad, comprising:

at least one organic compound selected from a group of amino acids;
at least one pH adjusting agent; and
deionized water.

27. The composition of claim 26, wherein the at least one organic compound selected from a group of amino acids comprises between about 0.01 wt. % and about 20 wt. % of the composition.

28. The composition of claim 26, wherein the composition has a pH value between about 9 to about 12.

29. The composition of claim 26, wherein the composition comprises about 6 wt. % of glycine, deionized water, potassium hydroxide as the pH adjusting agent, and a pH of about 10.5.

30. A polishing system for selectively removing dielectric material disposed on a substrate, comprising:

a polishing platen having a fixed abrasive polishing pad disposed thereon and in proximity with the substrate for polishing the substrate; and

a controller configured to cause the system to contact the substrate, to deliver to the substrate a polishing composition having at least one organic compound therein such that the polishing composition is in contact with the substrate and the fixed abrasive polishing pad, and to remove a first dielectric material at a higher removal rate than a second dielectric material.

31. The system of claim 30, further comprising:
a carousel;
at least one substrate head assembly suspended from the carousel and capable of holding a substrate thereon; and
a positioning member coupled to the carousel to move the carousel and to position the substrate head assembly over the polishing platen.
32. The system of claim 30, wherein the polishing platen is a linear web, a linear belt platen, or a rotatable platen.

2021 05 14 10:44:00